

**ADVANCED
CREW PERSONAL SUPPORT COMPUTER (CPSC)
TASK**

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**SPACE STATION EVOLUTION '91
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ADVANCED CREW PERSONAL SUPPORT COMPUTER (CPSC) TASK

- **BACKGROUND**
- **OBJECTIVES OF TASK**
- **BENEFITS TO SPACE STATION PROGRAM**
- **TECHNICAL APPROACH**
- **BASELINE INTEGRATION**
- **GROWTH AND EVOLUTION OPTIONS**
- **SUMMARY**

640 INTERNAL USE



Lyndon B. Johnson Space Center

D. Muratore 8/7/91

BACKGROUND

- **NECESSARY TO FREEZE COMPUTER DESIGN EARLY**
- **LEADING EDGE TECHNOLOGY NOT ALWAYS FEASIBLE - RISK**
- **DISADVANTAGES OF OLDER TECHNOLOGY**
 - **INCREASED MAINTENANCE COSTS**
 - **CANNOT EXPLOIT NEWER TECHNOLOGIES**
- **30 YEAR MISSION OF SPACE STATION FREEDOM**
- **FITTING MISSION REQUIRED SOFTWARE INTO LIMITED SHUTTLE COMPUTERS**



OBJECTIVE

- **PROCESS TO INTRODUCE NEW COMPUTER TECHNOLOGY INTO SSFP**
- **AUGMENT CORE COMPUTER CAPABILITIES TO MEET ADDITIONAL MISSION REQUIREMENTS**
- **MINIMIZE RISK IN UPGRADING TECHNOLOGY**
- **PROVIDE LOW COST WAY TO ENHANCE CREW AND GROUND OPERATIONS SUPPORT**

BENEFITS

- **TESTING IN PLACE INCREASES CONFIDENCE IN NEW TECHNOLOGY**
- **ISOLATION FROM CORE COMPUTERS PERMITS RAPID DEPLOYMENT OF NEW CAPABILITIES**
 - **FAULTS NOT PROPOGATED FROM CPSC TO CORE COMPUTERS**
- **SYSTEMS REMAIN CURRENT WHILE TAKING ADVANTAGE OF STATION'S CAPABILITIES**
- **MAINTAINS DEGREE OF TESTING AND RELIABILITY**
- **PREVENTS TECHNOLOGICAL OBSOLESCENCE**



TECHNICAL APPROACH

- **PHASE 1**
 - **MACINTOSH-BASED OBJECTIVES**
 - **RAPID PROTOTYPING TO DEVELOP REQUIREMENTS**
 - **CONVENIENT DEVELOPMENT PLATFORM**
- **PHASE 2**
 - **CPSC (DMS COMPATIBLE) OBJECTIVES**
 - **BUILDS ON PHASE 1 REQUIREMENTS**
 - **PROTOTYPE INCREMENTAL BLOCK HARDWARE**

PHASE 1 ACTIVITIES

- **DTO 1206 (STS-41 11/90) AND DTO 1208 (STS-43 8/91)**
- **CURSOR CONTROL DEVICE EVALUATION**
 - **1.25" BUILT-IN TRACKBALL**
 - **OPTICAL MOUSE**
 - **2" TRACKBALL WITH RESTRAINT RAIL**
 - **THUMBALL DEVICE**
 - **FELIX**
- **ADVANCED APPLICATIONS**
 - **WORLD MAP**
 - **ELECTRONIC FLIGHT DATA FILE (HYPERMEDIA)**
 - **ELECTRONIC MAIL**
 - **CREW ALARM MESSAGING**



PHASE 2 ACTIVITIES

- **PROTOTYPE HARDWARE AND SOFTWARE**
- **MODULAR PACKAGING TO PERMIT GROWTH AND EVOLUTIONARY PERFORMANCE UPGRADES**
- **EMPHASIS ON COMPATIBILITY WITH SPACE STATION FREEDOM DATA MANAGEMENT SYSTEM**
- **POTENTIAL SPINOFFS FROM DARPA'S STRATEGIC COMPUTING PROGRAM AND HIGH DEFINITION SYSTEMS PROGRAM**
- **DEMONSTRATION AND EVALUATION OF PROTOTYPES AS SPACE SHUTTLE PROGRAM (SSP) PAYLOADS**

BASELINE INTEGRATION

- **OPERATIONS DATA FILE**
 - **CREW ANNOTATION**
 - **HYPERMEDIA LINKING OF INFORMATION**
 - **STORAGE OF REFERENCE INFORMATION**
 - **ONLINE HELP**
- **ELECTRONIC MAIL/ DATA TRANSFER VIA VOICE CHANNEL OR DATA MANAGEMENT SYSTEM**
- **PAYLOAD SUPPORT**
 - **DATA ANALYSIS SOFTWARE (NON-REALTIME)**
 - **REALTIME DATA COLLECTION AND DISPLAY**



GROWTH AND EVOLUTION OPTIONS

- **CREW PERSONAL SUPPORT COMPUTER**
 - **PAYLOAD GENERAL SUPPORT COMPUTER FULFILLS THIS ROLE IN SSP BUT CURRENT HARDWARE WILL BE OBSOLETE BY SSFP FIRST ELEMENT LAUNCH**
 - **WORD PROCESSING AND SPREADSHEET**
- **CREW ALARM MESSAGE FUNCTION**
- **WORLD MAP**

GROWTH AND EVOLUTION OPTIONS

- **REMOTELY COMPUTED DISPLAYS**
 - **APPLICATION PROCESSING ON GROUND DISPLAYED ONORBIT VIA DATA TRANSFER CAPABILITIES**
 - **NO IMPACT TO CORE SYSTEMS IF VOICE CHANNEL USED**
- **HIGH DEFINITION IMAGING APPLICATIONS**
 - **STATION ASSEMBLY**
 - **STATION MAINTENANCE**
 - **CREW HEALTH CARE**
 - **EARTH OBSERVATION**